

Claims

I claim:

1. A tunable oscillator comprising:
 - 5 a control supply outputting a control output for tuning the tunable oscillator;
 - an oscillator circuit outputting a frequency which increases with increasing control output;
 - 10 a control circuit controlling the frequency of the oscillator circuit in response to a comparison of an oscillator circuit signal with a reference signal; and
 - 15 a propagation delay compensation circuit for varying the amplitude of the reference signal at substantially the same frequency as the oscillator to compensate for propagation delay of signals from the control circuit to the oscillator circuit.
2. The tunable oscillator of Claim 1, wherein the control supply is a current controlled oscillator and the control output is a control current.
- 20 3. The tunable oscillator of Claim 1, wherein the oscillator circuit comprises at least one capacitor charged and discharged in response to a comparison of a voltage of the capacitor with the reference signal.
4. The tunable oscillator of Claim 1; wherein the oscillator circuit comprises 25 two capacitors alternatively charged and discharged in response to a comparison of the voltages of the capacitors with the reference signal.
5. The tunable oscillator of Claim 4, wherein the control circuit comprises 30 two comparators for alternatively charging and discharging the two capacitors in response to comparisons of the voltages of the capacitors with the reference signal.

6. The tunable oscillator of Claim 1, further comprising first and second reference voltages controlling the amplitude of reference voltage output by the propagation delay compensation circuit.

5 7. The tunable oscillator of Claim 1, wherein the propagation delay compensation circuit oscillates to vary the amplitude of the reference signal to produce a signal rising and falling in phase with the output of the oscillator circuit.

10 8. The tunable oscillator of Claim 1, wherein the propagation delay compensation circuit decreases the amplitude of the reference signal as the control output increases and increases the amplitude of the reference signal as the control output decreases.

15 9. The tunable oscillator of Claim 2, wherein the amplitude of the reference signal decreases as the control current increases over a range of values and the amplitude of the reference signal increases as the control current decreases over the range of values so that a capacitor of the oscillator circuit charges to substantially the same voltage peak over the range of values.

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10. A method for compensating the propagation delay in a tunable oscillator comprising the steps of:

inputting a control current to an oscillator circuit for tuning the tunable oscillator;

25 detecting a signal of the oscillator circuit and comparing the signal to a reference signal from a reference circuit to produce a control signal;

supplying the control signal to both the oscillator and the reference circuit; and

30 outputting from the reference circuit the reference signal, the reference signal having substantially the same phase as the signal of the oscillator circuit and decreasing in amplitude as signal of the oscillator circuit increases.